Expansionary Fiscal Consolidations

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- The hypothesis of **expansionary fiscal consolidations** was echoed by the so-called German view, expressed in 1981-1982 by the German Council of Economic Experts [see Hellwig and Neumann (1987)].

- The idea of expansionary fiscal consolidations relates also to the possibility of non-Keynesian effects of fiscal policy.

- Such perspective was to some extent reflected in the fiscal convergence criteria of the Maastricht Treaty.

- Expansionary fiscal consolidations were initially studied for Denmark in 1983-86 and Ireland in 1987-89 [Giavazzi and Pagano (1990)].

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- A key point is the **expectations of economic agents** ("expectations view", "expectational view of fiscal policy").

- If a fiscal consolidation is seen as a serious and sustained attempt to decrease government debt, it can induce a wealth effect.

- Such wealth effect may lead to higher private consumption since consumers have expectations of lower future taxes.

- Lower government indebtedness:
    - reduces the risk premium and the real interest rate for government debt,
    - allows some *crowding-in* of private investment (or at least can mitigate *crowding-out*).

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Non-Keynesian effects via private consumption

- "trigger point" for public spending, the fiscal adjustment becomes more probable;

- after the adjustment there are expectations of future reduction in taxes, and consumers can consider that their permanent income has increased, which implies that private consumption may also rise.

Blanchard (1990),
Bertola and Drazen (1993),
McDermott and Westcott (1996),
Sutherland (1997), Perotti (1999).

Non-Keynesian effects via investment

- *crowding-in* of private investment, via the real interest rate;

- wage moderation in the public sector is an example for the private sector: enterprises may choose to increase investment.
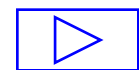
Alesina and Ardagna (1998),

Alesina et al. (1998).

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Episodes	Composition	Successes	Key concepts

Hip 1: The cumulative change in the cyclically adjusted primary budget balance is at least 5, 4, 3 pp of GDP in respectively 4, 3 or 2 years, or 3 pp in 1 year [Giavazzi, and Pagano (1996)].

Hip 2: The change in the cyclically adjusted primary budget balance is at least 2 pp of GDP in one year or at least 1.5 pp on average in the last 2 years [Alesina and Ardagna (1998)].

Hip 3: change in the cyclically adjusted primary balance is at least one and a half times the standard deviation (SD) in one year, or at least one SD on average in the last 2 years [Afonso, 2010)].

▷

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| **<u>Episodes</u>** | Composition | Successes | Key concepts |

The fiscal episode (*FE)* can be defined as a fiscal consolidation in *t*, as follows [Afonso et al., 2006]:

$$FE_t = \begin{cases} 1, \text{if } \Delta b_t > \gamma\sigma \\ 1, \text{if } \sum_{i=0}^{1} \Delta b_{t-i} / 2 > \sigma \\ 0, \text{otherwise} \end{cases} \qquad (1)$$

b – primary structural budget balance;
s – standard deviation of *b* for the panel sample (σ=1.5);
γ – a multiple of the standard deviation.

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Episodes	**Composition**	Successes	Key concepts

<u>Type 1 adjustment</u>: the budget deficit is reduced via the decrease in social spending (unemployment subsidies, etc.) and also in wage spending, in other words, current spending;

<u>Type 2 adjustment</u>: the budget deficit is reduced via the increase of revenue from income taxation and via the decrease in investment spending [Alesina and Perotti (1997)].

Usually, there is the idea that fiscal adjustments via a decrease in current spending have a higher probability of success:
- Ireland, 1987-1989, Type 1;
- Denmark, 1983-1986, Type 2.

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Episodes	Composition	**Successes**	Key concepts

• No consensus in the literature on how to assess the success of a fiscal consolidation.

• One can evaluate the change, *n* years after the fiscal contraction, of such variables as the primary balance or the debt-to-GDP ratio.

• Probit or Logit models for the empirical assessment.

• The dependent variable assumes the value 1 if the fiscal episode is considered as successful, and 0 otherwise.

• Explanatory variables that give information on the composition of the adjustment (expenditure or revenue based).

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Episodes	Composition	Successes	**Key concepts**

Fiscal consolidation – improvement of the (primary) budget balance, either in terms of its size or in terms of the period during which the consolidation occurs.

Non-Keynesian effect – resulting from the creation of expectations by consumers, which may reverse the sign of the traditional Keynesian multipliers.

For instance, if non-Keynesian effects dominate, a fiscal consolidation can lead to higher private consumption and economic growth.

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Episodes   Composition   Successes   **Key concepts**

Expansionary fiscal consolidation – fiscal consolidation that results in higher economic growth (similar idea of a non-Keynesian effect).
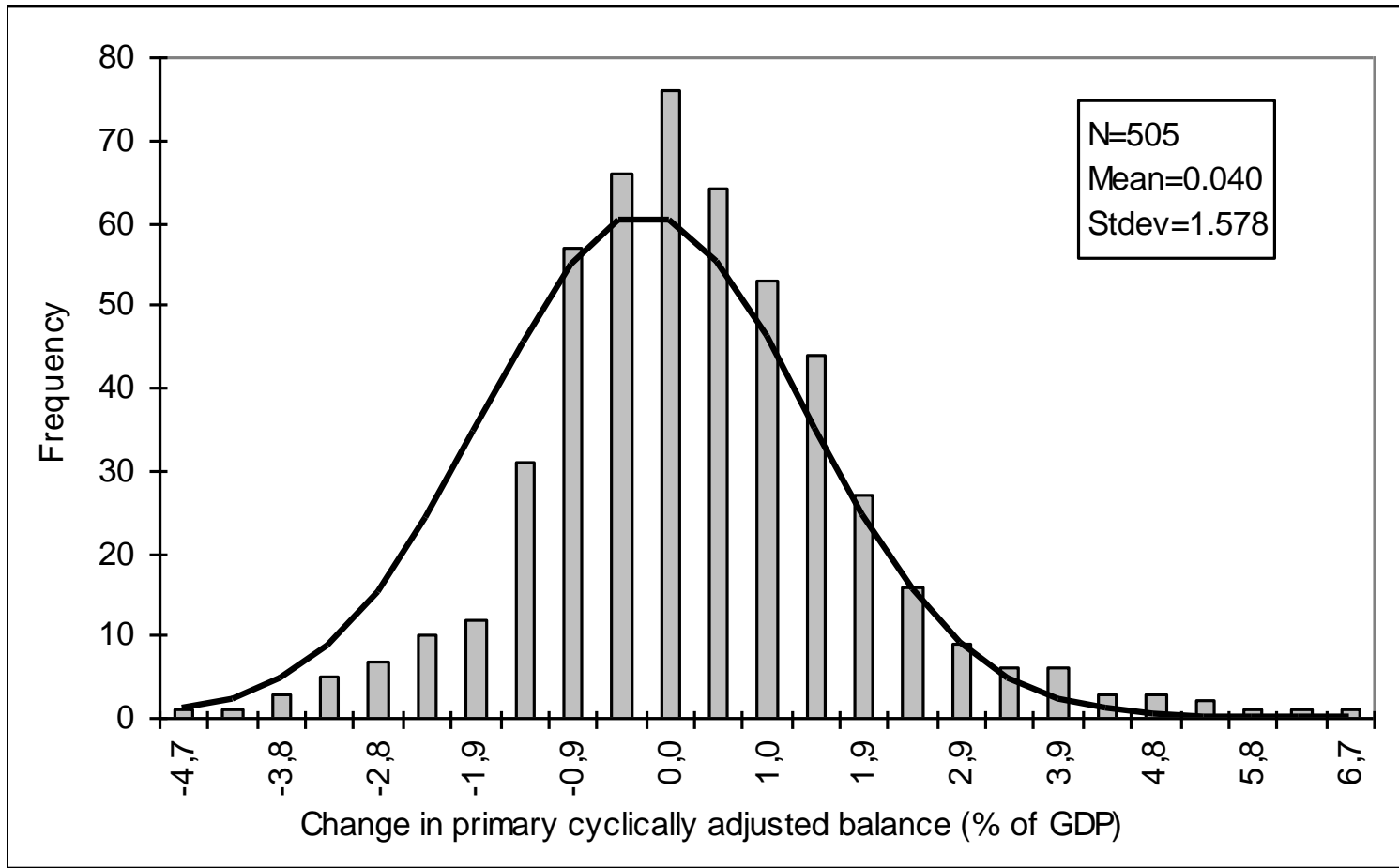
Ricardian households: smooth consumption, can save, and have access to credit. Non-ricardian households: credit constrained, consume their labour income in each period.

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Some evidence on expansionary fiscal consolidations

Authors	Data	Method	Results
Giavazzi and Pagano (1990)	10 OECD countries (1973-1989)	OLS	Public spending cuts increase private consumption.
Perroti (1999)	OECD countries (1965-1994)	VAR	The bigger the debt-to-GDP ratio the more likely that fiscal consolidation turns out to be expansionist.
Giavazzi, Jappelli and Pagano (2000)	OECD countries (1973-1996); Developing countries (1960-1995)	OLS with fixed effects	Fiscal contractions are expansionary when based on tax increases instead of spending cuts.
Heylen and Everaert (2000)	OECD countries (1975-1995)	OLS	Inconclusive.
van Aarle and Garretsen (2003)	EU countries (1990-1998)	OLS pooled	Inconclusive.
Ardagna (2004)	17 OECD countries (1975-2002)	OLS pooled	Evidence of non-Keynesian effects.
Giudice et al. (2004)	14 EU countries (1970-2002)	EC QUEST model	Evidence of non-Keynesian effects.
Afonso (2010)	15 EU countries (1970-2005)	Panel analysis	Some evidence of non-Keynesian effects.

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Determination of fiscal episodes (1):

N=505
Mean=0.040
Stdev=1.578

Changes in the primary cyclically adjusted budget balance: EU-15, 1970-2005. Source: Afonso (2010)

Distribution centred on zero, skewed to the right, with a long right tail.

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Determination of fiscal episodes (2):

$$FE_t = \begin{cases} 1, \text{if } \Delta b_t > \gamma\sigma \\ 1, \text{if } \sum_{i=0}^{1} \Delta b_{t-i} / 2 > \sigma \\ 0, \text{otherwise} \end{cases}$$

b – primary cyclically adjusted budget balance;
σ – standard deviation of the primary cyclically adjusted balance in the sample;
γ – parameter applied to determine a multiple of σ (for simplicity $\gamma = 1.5$).

Fiscal episode – the change in the primary cyclically adjusted balance is at least 1.5 times the σ in one year or is at least 1 σ on average in the last two years.

– Giavazzi and Pagano (1996): cumulative change in the primary cyclically adjusted balance is at least 5, 4, 3 pp of GDP in 4, 3 or 2 years, or 3 pp in one year.
– Alesina and Ardagna (1998): change in the primary cyclically adjusted balance is at least 2 pp of GDP in one year or at least 1.5 pp on average in the last two years.

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Fiscal episodes (Afonso, 2010)

	FE1		FE2		FE3	
	Expansions	Contractions	Expansions	Contractions	Expansions	Contractions
AU	76	97	76	84, 97, 01	76	84, 97, 01
BE		82-85, 95-96		82-83, 85, 95		82-83
DK	76, 94	**83-87**, 95-97	76, 82, 94	**83-86**, 95-96	76, 94	**83-86**, 95-96
FI	79-80, 87	76-77, 95-96, 00-01	78-79, 87	76-77, 95-96, 00-01	79, 87	76-77, 95-96, 00-01
FR		96-97		95-96		96
GE	75, 90-92	82-83	75, 90-91	82-83	75, 90-91	83
GR	81, 85, 89-90, 01-04	82-83, 87, 91-97	75, 81, 85, 88-89, 01-02, 04	82-83, 86-87, 91-92, 94-97, 05	81, 85, 88-89, 01-02	82-83, 86-87, 91-92, 94-95, 05
IR	75, 78-79, 01-02	76-77, 83-86, **88-89**, 04	74-75, 78-79, 95, 99, 01-02	76-77, 83-84, **88-89**, 04	74-75, 78-79, 01-02	76-77, 83-84, **88** 04
IT		77, 83, 92-94		77, 83, 91-93		77, 83, 92-93
LU	86-87, 02-05	83-85, 01	86-87, 02-04	83-85, 01	86-87, 02-03	83-85, 01
NL		93, 95-98		91, 93, 95-96		95-96
PT	74, 80-81	82-86, 92	80-81, 05	82-83, 86, 92	80-81, 05	82-83, 86, 92
SP		95-98		95-96		95-96
SW	74, 79-80, 91-94, 02-03	84, 87, 95-99	74, 79, 91-93, 01-02	76, 83-84, 87, 95-97	74, 79, 91-93, 02	87, 95-97
UK	72-75, 92-93, 02-04	81, 95-99	72-73, 92-93, 02-03	81, 95-98	72-73, 92-93, 02-03	95-98
yrs	**51**	**81**	**47**	**71**	**39**	**58**
dur	**2.0**	**2.5**	**1.6**	**1.8**	**1.6**	**1.8**

FE1 – Used by Giavazzi and Pagano (1996); **FE2 – Used by Alesina and Ardagna (1998)**; **FE3 – Afonso (2010)**.

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FE1, FE2: 76%. FE1, FE3: 68%. FE2, FE3: 82%.

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- The positive correlation between private consumption and a fiscal expansion may be reversed: non-Keynesian effects.
- To assess non-Keynesian effects on private consumption,

$$\Delta C_{it} = c_i + \lambda C_{it-1} + \omega_0 Y_{it-1} + \omega_1 \Delta Y_{it} + \delta_0 Y_{it-1}^{oecd} + \delta_1 \Delta Y_{it}^{oecd} +$$

$$(\alpha_1 FCE_{it-1} + \alpha_3 \Delta FCE_{it} + \beta_1 TF_{it-1} + \beta_3 \Delta TF_{it} + \gamma_1 TAX_{it-1} + \gamma_3 \Delta TAX_{it}) \times FC_{it}^m +$$

$$(\alpha_2 FCE_{it-1} + \alpha_4 \Delta FCE_{it} + \beta_2 TF_{it-1} + \beta_4 \Delta TF_{it} + \gamma_2 TAX_{it-1} + \gamma_4 \Delta TAX_{it}) \times (1 - FC_{it}^m) + \mu_{it}$$

(10)

C – private consumption;
Y – GDP;
Y^{oecd} – OECD's GDP;
FCE – general government final consumption expenditure;
TF – social transfers;
TAX – taxes;
　　　(logarithms of the real per capita observations)
FC^m – value 1 if there is a fiscal consolidation, 0 otherwise
(m=1, 2, 3, three alternative definitions for episodes).

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Baseline results (70-05)

		FE1 (I)	lr	FE2 (II)	lr	FE3 (II)	lr
λ	C_{t-1}	-0.072 ***		-0.070 ***		-0.069 ***	
		(-4.29)		(-4.20)		(-4.15)	
ω_0	Y_{t-1}	0.069 ***	0.970	0.068 ***	0.966	0.066 ***	0.951
		(4.39)		(4.38)		(4.26)	
ω_1	ΔY_t	0.693 ***		0.690 ***		0.688 ***	
		(14.54)		(14.31)		(14.32)	
δ_0	C_{t-1}	0.004		0.004		0.004	
		(0.62)		(0.69)		(0.74)	
δ_1	Y_{t-1}	0.043 ***		0.041 ***		0.040 **	
		(2.70)		(2.56)		(2.50)	

- **short-run elasticity** of private consumption to income is approximately 0.69 in the three specifications;
- **long-run elasticity** of private consumption to income is close to one, indicating a stable relation between private consumption and income; ($-\omega_0/\lambda$);

- short-run elasticity for the OECD income is also statistically significant.

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Baseline results (70-05)

			FE1 (I)	lr	FE2 (II)	lr	FE3 (II)	lr	
α_1	FCE_{t-1}		-0.029 *** (-2.16)	-0.410	-0.027 *** (-1.90)	-0.390	-0.020 (-1.35)	-0.290	lr negative effect of FCE net of TAX on C -0.4(FCE-TAX)
α_3	ΔFCE_t		0.002 (0.03)		0.022 (0.42)		0.014 (0.26)		
β_1	TF_{t-1}	FC^m	-0.008 (-0.70)		-0.013 (-1.12)		-0.013 (-1.09)		
β_3	ΔTF_t		-0.012 (-0.19)		0.001 (0.01)		0.021 (0.28)		
γ_1	TAX_{t-1}		0.029 ** (2.5)	0.405	0.032 *** (2.63)	0.451	0.026 ** (2.03)	0.372	
γ_3	ΔTAX_t		0.073 * (1.67)		0.025 (0.52)		0.030 (0.56)		
α_2	FCE_{t-1}		-0.015 (-1.56)	-0.214	-0.017 * (-1.73)	-0.241	-0.019 * (-1.94)	-0.290	lr elasticity of C to FCE is negative, a reduction of FCE increases C
α_4	ΔFCE_t		0.028 (0.95)		0.025 (0.84)		0.023 (0.78)		
β_2	TF_{t-1}	$(1-FC^m)$	-0.006 (-0.75)		-0.006 (-0.70)		-0.005 (-0.65)		
β_4	ΔTF_t		0.022 (1.07)		0.020 (0.96)		0.019 (0.87)		lr elasticity of C to TAX is positive, an increase of TAX increases C
γ_2	TAX_{t-1}		0.015 * (1.86)	0.209	0.016 * (1.94)	0.222	0.017 ** (2.17)	0.252	
γ_4	ΔTAX_t		-0.008 (-0.33)		-0.002 (-0.08)		-0.003 (-0.13)		

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Asymmetric effects of fiscal policy?

$$\Delta C_{it} = c_i + \lambda C_{it-1} + \omega_0 Y_{it-1} + \omega_1 \Delta Y_{it} + \delta_0 Y_{it-1}^{oecd} + \delta_1 \Delta Y_{it}^{oecd} + \qquad (11)$$

$$(\alpha_5 FCE_{it-1} + \alpha_6 \Delta FCE_{it} + \beta_5 TF_{it-1} + \beta_6 \Delta TF_{it} + \gamma_5 TAX_{it-1} + \gamma_6 \Delta TAX_{it}) \times (1 - FC_{it}^m) \times (1 - FX_{it}^m)$$

$$+(\alpha_2 FCE_{it-1} + \alpha_4 \Delta FCE_{it} + \beta_2 TF_{it-1} + \beta_4 \Delta TF_{it} + \gamma_2 TAX_{it-1} + \gamma_4 \Delta TAX_{it}) \times (1 - FC_{it}^m) \times FX_{it}^m$$

$$+(\alpha_1 FCE_{it-1} + \alpha_3 \Delta FCE_{it} + \beta_1 TF_{it-1} + \beta_3 \Delta TF_{it} + \gamma_1 TAX_{it-1} + \gamma_3 \Delta TAX_{it}) \times FC_{it}^m + \mu_{it}$$

FC^m – value 1 if there is a fiscal consolidations, 0 otherwise.
FX^m – value 1 if there is a fiscal expansion, 0 otherwise.

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			FE1 (I)	FE2 (II)	FE3 (II)
β_5	TF_{t-1}		-0.056 ***	-0.058 ***	-0.056 ***
			(-3.39)	(-3.63)	(-3.65)
β_6	ΔTF_t	$(1-FC^m)$ $(1-FX^m)$	-0.009	-0.025	-0.024
			(-0.20)	(-0.57)	(-0.56)
γ_5	TAX_{t-1}		0.106 ***	0.104 ***	0.106 ***
			(3.48)	(3.45)	(3.58)
γ_6	ΔTAX_t		0.107 ***	0.093 ***	0.100 ***
			(2.72)	(2.35)	(2.73)
β_2	TF_{t-1}		-0.061 ***	-0.050 **	-0.074 ***
			(-2.67)	(-2.15)	(-2.92)
β_4	ΔTF_t	$(1-FC^m)$ FX^m	-0.077	0.072	-0.228 **
			(-0.67)	(0.83)	(-2.17)
γ_2	TAX_{t-1}		0.140 ***	0.104 ***	0.164 ***
			(3.08)	(3.45)	(4.32)
γ_4	ΔTAX_t		0.154 *	0.183 **	0.316 ***
			(1.79)	(2.23)	(3.78)
β_1	TF_{t-1}		-0.069 ***	-0.057 ***	-0.060 ***
			(-3.51)	(-2.95)	(-3.25)
β_3	ΔTF_t	FC^m	0.003	0.081	0.087
			(0.04)	(1.08)	(1.10)
γ_1	TAX_{t-1}		0.104 ***	0.097 ***	0.098 ***
			(3.25)	(3.21)	(3.25)
γ_3	ΔTAX_t		0.023	0.018	0.026
			(0.41)	(0.31)	(0.44)

Asymmetric effects of fiscal policy? (post-Maastricht, 92-05)

With a fiscal expansion the magnitude of the short-run effects of taxes on private consumption is bigger than in the absence of fiscal episodes ($\gamma_4 > \gamma_6$).

But one does not usually reject that $\gamma_6 - \gamma_4 = 0$.

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Assessing successful fiscal consolidations
[Afonso et al., 2006]

• <u>Consolidation episode</u>, E:

$$E_t = \begin{cases} 1, \text{ if } \Delta b_t^* > [\mu + (2/3)\sigma] \\ 0, \text{ otherwise} \end{cases} \quad (12)$$

μ, σ : average, standard deviation of discretionary changes in the budget balance-to-GDP ratio [EU NMS 10+2, EU15, 1991-2003].

• <u>Successful consolidation</u>, S:

$$S_t = \begin{cases} 1, \text{ if } \sum_{i=0}^{1} \Delta b_{t+i}^* > 1.5\sigma \\ 0, \text{ otherwise} \end{cases} \quad (13)$$

• <u>Composition of adjustment</u>, EXD (when consolidations are successful), exp is the % of total spending in GDP:

$$EXD_t = \begin{cases} 1, \text{ if } (\Delta \exp_t / \Delta b_t^*) > (2/3) \\ 0, \text{ otherwise} \end{cases} \quad (14)$$

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Determinants of successful fiscal consolidations, Logit model

$$P_i = E[S = 1 \mid Z_i] = \frac{e^{Z_i}}{1 + e^{Z_i}} \tag{15}$$

$$S = \begin{cases} 1, & \text{consolidation is successful,} \\ 0, & \text{consolidation is not successful;} \end{cases}$$

$$Z_i = \alpha + \beta B_i + \delta EXP_i \tag{16}$$

$E[S=1/Z_i]$ – conditional expecation of success, given Z_i;
P – conditional probability that a success occurs, given Z_i.

$$Z_i = (\alpha_1 + \alpha_2 D_i) + \beta_1 B_i + \beta_2 (D_i B_i) + \delta_1 EXD_i + \delta_2 (D_i EXD_i) \tag{17}$$

D – group dummy, 1 if the country belongs to EU-15, 0 if it belongs to EU NMS 10+2;
B – "discretionary component" of primary budget balance;
EXD – spending composition dummy.

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Total balance, 1991-2003

	EU-15, CE-10		EU-15	CE-10
	No group dummy, eq. (13)	With group dummy, eq. (14)	Eq. (13)	Eq. (13)
α(constant)	−2.48 ** (−2.09)		−2.97 (−1.44)	−3.11 * (−1.87)
α_1		−3.11 * (−1.87)		
α_2		0.14 * (2.65)		
$\beta(B)$	0.83 ** (2.15)		1.42 * (1.75)	0.60 (1.33)
β_1		0.60 (1.33)		
β_2		0.82 (0.88)		
$\delta(EXP)$	1.89 *** (2.57)		1.19 (1.18)	3.38 ** (2.52)
δ_1		3.38 ** (2.52)		
δ_2		−2.20 (−1.31)		
McFadden R^2	0.29	0.30	0.14	0.48
Nº of observations	51	51	28	23
dP/dZ: B	0.14	0.09	0.24	0.06
		0.12		
EXP	0.32	0.48	0.20	0.36
		−0.31		

Note: The *t*-statistics are in parentheses. *, **, *** denote significance at the 10, 5 and 1 per cent level respectively. The effect in the probability of success from a change in a continuous variable Z_i is approximated by $dP/dZ \cong \beta[P_i(1 - P_i)]$.

• *B*, discretionary change in the balance, relevant to explain successes, except in CE10+2.

• weight of the change in spending-to-GDP ratio, in change of the balance, *EXD*, relevant for CE10+2.

Source: Afonso et al. (2006).

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Table 1. Fiscal episodes (FE) based on the change in the primary cyclically adjusted budget balance and on the so-called policy action-based approach

Country	IMF contractions	FE1 contractions	FE2 contractions	FE3 contractions
Australia	1980, 1985–1988, 1994–1999	1987–1988	1987–88	1987–1988
Austria		1997	1984, 1997, 2001, 2005	1984, 1997, 2001, 2005
Belgium	1982–1984, 1987, 1990, 1992–1999	1982–1987	1982–1985, 1993, 2006	1982–1985
Canada	1980–1999	1987, 1996–1998	1981, 1986–1987, 1996–1997	1987, 1996–1997
Denmark	1983–1986, 1995	1983–1987	1983–1986	1983–1986
Finland	1984, 1988, 1992–2000, 2006–2007	1976–1977, 1997–1998, 2000–2001	1976–1977, 1981, 1984, 1988, 1996–1997, 2000–2001	1976–1977, 1996–1997, 2000–2001
France	1984, 1986–1989, 1991, 1995–1998, 2000, 2006–2007			
Germany	1982–1989, 1992–2000, 2003–2007			

Source: Afonso, Jalles (2012).

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Table 1. Fiscal episodes (FE) based on the change in the primary cyclically adjusted budget balance and on the so-called policy action-based approach

Country	IMF contractions	FE1 contractions	FE2 contractions	FE3 contractions
Greece		1991–1992, 1994, 1996–1999, 2006, 2010	1982, 1986, 1991–1992, 1996–1998, 2005–2006, 2010	1991,1994, 1996–1997, 2006, 2010
Ireland	1982–1988, 2009	1976–1977, 1983–1986, 1988–1989, 2010	1976–1977, 1983–1984, 1988, 2010	1976–1977, 1983–1984, 1988, 2010
Italy	1992–998, 2004–2007	1977, 1982–1983, 1992–1994	1977, 1982–1983, 1992–1993	1977, 1982–1983, 1992–1993
Japan	1997, 2003–2007	1998–2000, 2005–2007	1998–1999, 2005–2006	1999–2000, 2006–2007
The Netherlands		1991, 1993	1991, 1993	1991
Portugal	1983, 2000–2003, 2005–2007	1977, 1983-84, 1986	1977, 1983–1984, 1986, 1988, 1992, 1995, 2006	1977, 1983–1984, 1986, 1988, 1992
Spain	1983–1989, 1992–1998	1987	1986, 1987, 2010	1987
Sweden	1983–1984, 1986, 1992–1997, 2007	1984, 1987, 1996–1999	1976, 1983–1984, 1987, 1996–1997	1984, 1987, 1996–1997
United Kingdom	1981–1982, 1994–1999	1981–1982, 1997–2000	1981, 1997–1998, 2000	1981, 1997–1998
United States	1980–1981, 1985–1986, 1988, 1990–1991, 1993–994, 2000			
Years with episodes	172	73	79	59
Average duration (years)	3.8	2.1	1.5	1.6

Source: Afonso, Jalles (2012).

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Table 2. Events and successes, 1970–2010

	Total events	Successes	Success rate (%)
IMF	171	63	36.8
FE1	73	39	53.4
FE2	79	51	64.6
FE3	59	38	64.4

Notes: All measures computed by the authors, except the IMF one.
FE1 – measure based on Giavazzi and Pagano (1996): the cumulative change in the primary cyclically adjusted budget balance is at least 5, 4, 3 percentage points of GDP in respectively 4, 3 or 2 years, or 3 percentage points in 1 year.
FE2 – measure based on Alesina and Ardagna (1998): the change in the primary cyclically adjusted budget balance is at least 2 percentage points of GDP in 1 year or at least 1.5 percentage points on average in the last 2 years.
FE3 – measure based on Afonso (2010): a fiscal episode occurs when either the change in the primary cyclically adjusted balance is at least one and a half times the SD (from the full panel sample) in 1 year, or when the change in the primary cyclically adjusted balance is at least one SD on average in the last 2 years.
IMF – measure computed by Devries *et al.* (2010), so-called policy action-based approach to account for consolidation episodes.

Source: Afonso, Jalles (2012).

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$$Bud = T - G \qquad\qquad (1)$$

$$Budprim = T - G + Int \qquad (2)$$

$$Bud > 0, \text{ surplus; } Bud < 0, \text{ deficit.}$$

Bud – total budget balance;

$Budprim$ – primary budget balance;

G – total spending;

T – total revenue;

Int – interest payments;

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$$Bud^S = Bud - Bud^C \qquad (3)$$

$$T_{i,t} = T_{i,t}^C + T_{i,t}^S \qquad (4)$$

$$G_{i,t} = G_{i,t}^C + G_{i,t}^S \qquad (5)$$

Bud^C – cyclical budget balance;

Bud^S – structural or cyclically adjusted budget balance (CAB);

T^C – cyclical revenue; T^S – structural revenue;

G^C – cyclical spending; G^S – structural spending;

i – budgetary category;

t – period.

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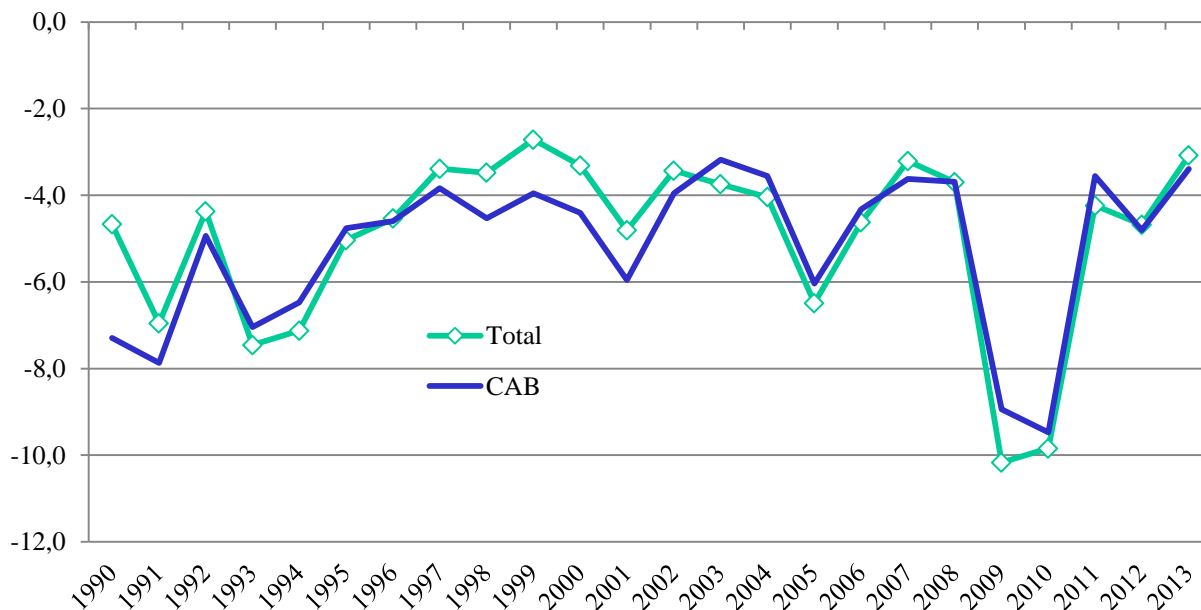
$$OutGap_t = \left(\frac{Y_t - Y_t^*}{Y_t^*} \right) \qquad (6)$$

Y – GDP;

$Y*$ – potencial GDP.

$$T_{i,t}^c = T_{i,t} \left(\frac{Y_t^*}{Y_t} \right)^{\gamma_i} \qquad\qquad G_t^c = G_t \left(\frac{Y_t^*}{Y_t} \right)^{\beta}$$

- Estimation of budgetary category reaction to OutGap (computing elasticities, γ, β);
- Cyclical components of the relevant budgetary categories are computed;
- Overall cyclical budget balance is subtracted from the total balance to get the cylically adjusted, structural, budget balance (CAB).
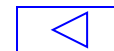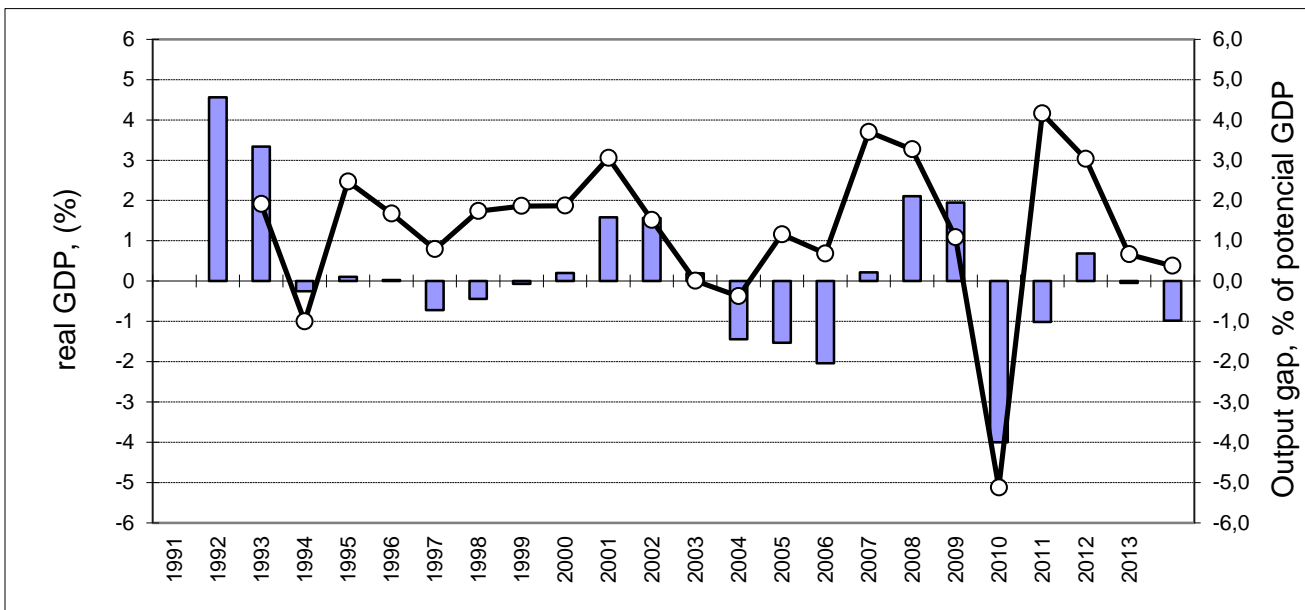
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Portugal, output gap
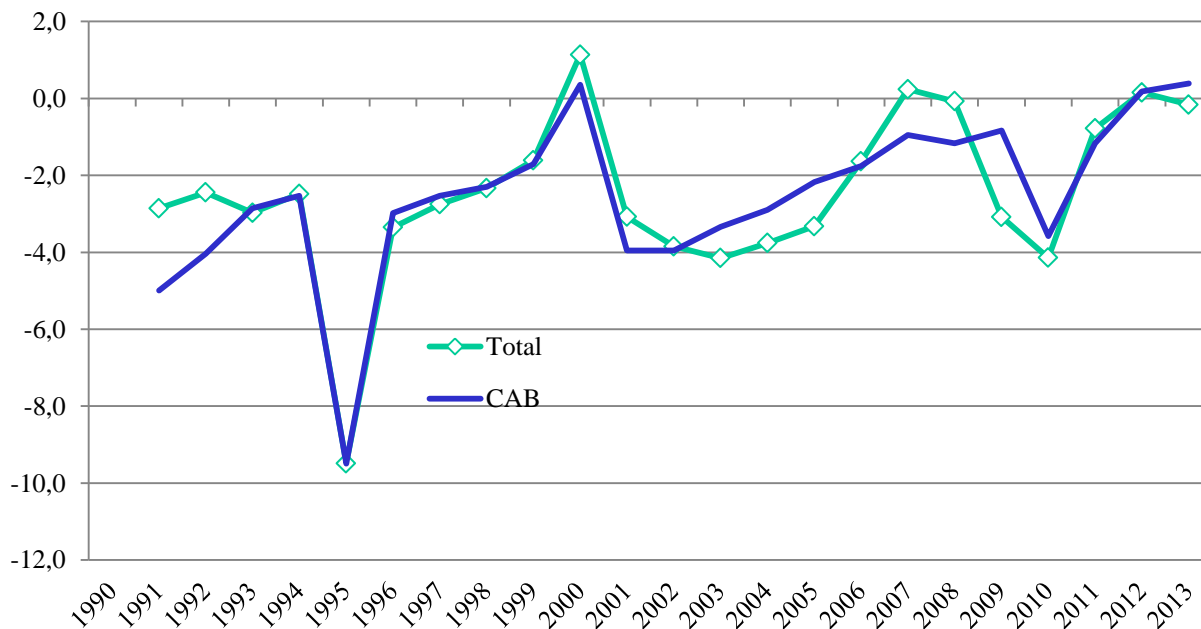(Deviations of actual GDP from potential GDP, % of potential GDP)

Total and structural budget balance

Source: AMECO and EC, spring Economic Forecasts, April 2013.

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Germany, output gap
(Deviations of actual GDP from potential GDP, % of potential GDP)

Total and structural budget balance

Source: AMECO and EC, spring Economic Forecasts, April 2013.

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